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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,421	12/19/2005	Kiyoshi Arita	39102	6392
52/054	7590	03/23/2009	EXAMINER	
PEARNE & GORDON LLP			LUND, JEFFRIE ROBERT	
1801 EAST 9TH STREET			ART UNIT	PAPER NUMBER
SUITE 1200			1792	
CLEVELAND, OH 44114-3108				
NOTIFICATION DATE		DELIVERY MODE		
03/23/2009		ELECTRONIC		

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/561,421

Filing Date: December 19, 2005

Appellant(s): ARITA ET AL.

Michael W. Garvey
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 8, 2008 appealing from the Office action mailed October 28, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,625,526	Watanabe et al	4-1997
5,670,066	Barnes et al	9-1997

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6,815,646 B2	Ito et al	11-2004
5,589,003	Zhao et al	12-1996
6,164,633	Mulligan et al	12-2000
2002/0179246 A1	Garabedian et al	12-2002
2003/0198005 A1	Sago et al	10-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-6 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (US 5,625,526) in view of Barnes et al. (US 5,670,066), Ito et al. (US 6,815,646 B2), Zhao et al. (US 5,589,003) and Mulligan et al. (US 6,164,633).

Watanabe teaches:

i. A plasma processing apparatus (Fig. 31), comprising: an integrally formed electrode member (520), which is located in a process chamber (504) that defines a closed space; a pressure reduction unit (526, 529), for discharging a gas from the closed space to reduce pressure; a gas supply unit (517), for supplying a plasma generation gas to the closed space in which the pressure has been reduced; an opposing electrode (518), positioned opposite the electrode member; a plasma generator (521), for applying a high frequency voltage between the electrode member and the opposing electrode to set the plasma generation gas into a plasma state; a DC voltage application unit (Figure 31 DC source below reference number 526 in figure 31, Abstract), for applying a DC voltage to the electrode member to electrostatically attract the wafer positioned on the mounting face; a cooling unit (524) for cooling the electrode member - in claims 1 and 9; a ceramic film (416) made of aluminum oxide on a surface of an electrode member (414) - in claims 6 and 13; and a polyimide resin film (417) on a surface of an electrode member (414) - in claims 11 and 12. (Figs. 27 and 31; Col. 18, lines 31-35; Col. 19, lines 43-64)

Watanabe does not teach:

i. An apparatus that can handle at least two wafers, a large wafer and a small wafer; the mounting face of the electrode member is divided into a first area, which is located in the center of the mounting face, wherein a metal, the material used for the electrode member, is exposed, a first insulating area, the

surface of which is covered with an insulating film, that encloses, like a ring, the outer edge of the first area, a second area, wherein the metal is exposed, that is extended, like a ring, around the outer edge of the first insulating area, and a second insulating area, the surface of which is covered with an insulating film, that encloses, like a ring, the outer edge of the second area, wherein a boundary between the first area and the first insulating area is designated inside the outer edge of a small wafer positioned in the center of the mounting face, and a boundary between the first insulating area and the second area is designated outside the outer edge of the small wafer, and wherein a boundary between the second area and the second insulating area is designated inside the outer edge of a large wafer positioned in the center of the mounting face, and the second insulating area extends outward from the large wafer- in claims 1 and 9; a plurality of suction holes are formed in the first and the second areas and a vacuum suction unit is provided to create a vacuum and produce suction that, through the suction holes, draws the wafer to and holds the wafer on the mounting face - in claim 9; and wherein a cover member, which has a ring shape and which is detachable from the mounting face, is closely adhered across the entire face of the second area to completely cover all the suction holes formed in the second area - claim 2, in claim 9; the cover member, which has a resin layer deposited on its lower face, is attached to the mounting face when a small wafer is to be processed, or is removed from the mounting face when a large wafer is to be processed - claims 3 and 10, in claims 11 and 12; the cover member is

made of ceramic - claim 4; and the cover member is formed of a thick outer ring and a thin internal ring that engages the thick outer ring - claim 5.

Mulligan teaches a vacuum chuck for a semiconductor processing apparatus comprising:

- i. A mounting surface (28, 30) constructed to accommodate at least two different-sized wafers - in claims 1 and 9. (Figs. 1-3, Col. 4, lines 12-15)

Barnes teaches a plasma processing apparatus comprising:

- i. The mounting face (36) of the electrode member (30) is divided into a first area (area surrounded by inner portion of 40), which is located in the center of the mounting face, wherein a metal, the material used for the electrode member, is exposed, a first insulating area (inner portion of 40), the surface of which is covered with an insulating film, that encloses, like a ring, the outer edge of the first area, and a second area (36), wherein the metal is exposed, that is extended, like a ring, around the outer edge of the first insulating area, and a second insulating area (44), the surface of which is covered with an insulating film, that encloses, like a ring, the outer edge of the second area, - in claims 1, 6, 9, and 13. (Fig. 1, Col. 3, lines 49-63)

Ito teaches components for a semiconductor manufacturing apparatus comprising:

- i. A vacuum chuck (101, Fig. 5g) with a plurality of suction holes (8) formed in chuck body and a vacuum suction unit (not shown) is provided to create a vacuum and produce suction that, through the suction holes, draws the

wafer to and holds the wafer on the mounting face - in claim 9. (Fig. 5, Col. 15, lines 32-37)

Zhao teaches a semiconductor processing apparatus comprising:

i. A cover member (12), which has a ring shape and which is detachable from the mounting face (16) - in claims 2 and 9; the cover member is made of ceramic (aluminum oxide) - claim 4, in claim 11; and the cover member is formed of a thick outer ring (24) and a thin internal ring (22) that engages the thick outer ring - claim 5, in claim 12. (Fig. 1; Col. 3, line 30 to Col. 4, line 53)

Applicant's claim requirements of "performs a plasma process for the reverse face of a wafer for which an insulating sheet is adhered to the obverse face" in claims 1 and 9, and "the cover member is attached to the mounting face when a small wafer is to be processed, or is removed from the mounting face when a large wafer is to be processed" in claims 3 and 10 are claim requirements of intended use in the pending apparatus claims that the apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao can perform. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is Capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Watanabe with Mulligan's multiple size wafer support, Barnes' electrostatic chuck with annular insulating members, Ito's vacuum suction holes, and Zhao's substrate support cover for the modified apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao; it would also have been obvious to add the resin layer of Watanabe to the cover of Zhao; select the size of wafers to fit the modified apparatus, or optimize the dimensions of the modified apparatus to accommodate different-sized wafers; and optimize the dimensions of the modified apparatus so the support cover can shield the second area.

Motivation for adapting Mulligan's multiple size wafer support for the apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao is to eliminate the need for separate apparatuses when different-sized wafers are to be processed.

Motivation for combining Watanabe's ceramic film with Barnes' segmented electrostatic chuck for the apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao is to be able to isolate the object (wafer) supported on the surface of the face of a single electrode member.

Motivation for adapting Ito's vacuum suction holes for the apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao is to attract the wafer to the support through vacuum force.

Motivation for adapting Zhao's substrate support cover for the modified apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao is to protect the unused portion of the substrate support from plasma damage.

Motivation for adding Watanabe's resin layer to Zhao's cover member is to provide an alternate placement for the resin layer. Further, it is well established that the rearrangement of parts is considered obvious to those of ordinary skill (*In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950); *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975); *Ex parte Chicago Rawhide Manufacturing Co.*, 223 USPQ 351,353 (Bd. Pat. App. & Inter. 1984); MPEP 2144.04)

Motivation for selecting the size of wafers to fit the modified apparatus, or optimizing the dimensions of the modified apparatus to accommodate different-sized wafers is to eliminate the need for multiple apparatuses for processing different-sized wafers. Further; it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (*Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

Motivation for optimizing the dimensions of the modified apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao so the support cover can shield the second area is to protect the second area from plasma damage and prevent plasma from being vacuumed through the suction holes. Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (*Gardner V. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

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4. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (US 5,625,526) in view of Barnes et al. (US 5,670,066), Ito et al. (US 6,815,646 B2), Zhao et al. (US 5,589,003) and Mulligan et al. (US 6,164,633) as applied to claims 1-6 and 9-13 above, and further in view of Garabedian et al. (US 2002/0179246 A1) and Sago et al. (US 2003/0198005 A1).

Watanabe, Barnes, Ito, Zhao, and Mulligan do not teach:

i. A blocking member, having a ring shape, that is attached to the second area, when the cover member is mounted on the mounting face, to block the plurality of suction holes in the second area, wherein the cover member completely covers the blocking member - in claim 7.

ii. The blocking member is formed by adhering, to one face of a ring-shaped plate made of the same material as the wafer, an insulating sheet made of the same material as the insulating sheet that is adhered to the wafer - claim 8.

Garabedian teaches a plasma processing apparatus comprising:

i. A lower ring-shaped member (lower ring 22) covered by an upper ring-shaped member (upper ring 22), wherein both members are disposed on top of a substrate support (9) as plasma shields - in claim 7. (Fig. 6, Para. 39 and 44)

Sago teaches a substrate processing apparatus comprising:

i. A correction ring (46) disposed around a substrate (9), and the ring is made of the same material as the substrate - in claim 8. (Fig. 3, Para. 38)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adapt the two-ring shield concept of Garabedian for the apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao; and construct the lower shield with the same material as the substrate as taught by Sago. It would also have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the dimensions of the shields to cover the second area, and mimic the substrate exactly by including an insulation sheet.

Motivation for adapting the two-ring shield of Garabedian for the apparatus of Watanabe, Mulligan, Barnes, Ito, and Zhao; and constructing the lower shield with the same material as the substrate as taught by Sago is to maintain protection from plasma damage as taught by Garabedian, while the modified lower ring prevents non-uniformity of the process at the edge of the substrate by keeping temperature uniform at the periphery of the substrate.

Motivation for optimizing the dimensions of the shields to cover the second area is to protect the unused portion of the substrate holder from damage by plasma.

Motivation for mimicking the substrate exactly by including an insulation sheet is to ensure heat transfer properties are identical in both the real substrate and the dummy substrate.

Applicant's claim requirement of "to block the plurality of suction holes in the second area" in claim 7 is a "claim requirement of intended use in the pending apparatus claim that the apparatus of Watanabe, Mulligan, Barnes, Ito, Zhao, Garabedian, and Sago can perform. Further, it has been held that claim language that

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simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106).

Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

(10) Response to Argument

In regard to the argument:

Barnes does not disclose that the insulating rings (40, 44) are configured in an area such that an outer edge of a wafer (32) lies within the boundaries of the insulating rings (40, 44). Rather, the mounting face is configured such that the outer edge of the wafer (32) is positioned within the boundary of the second electrode (38). [Col. 4, 11. 14-18] The electrical insulating rings (40, 44) of Barnes are merely used so that the first and second electrodes (34, 38) can be at different electric potentials relative to each other and the housing (42). [Col. 3, 11.49- 61]

The Examiner disagrees for the following reasons. First, Barnes clearly discloses that the outer edge of the wafer is positioned on the electrode 38 which is within the boundaries of the insulating ring 40. The claims do not limit the presence of any other object such as electrode 38 upon which the wafer rests. Thus Barnes clearly teaches that the outer edge of the wafer is positioned within the boundaries of the insulating ring. Second, the specific wafer worked on is an intended use of the apparatus and the apparatus of Barnes is capable of supporting a wafer that has a boundary between the second area and the second insulating area is designated inside the outer edge of a large wafer positioned in the center of the mounting face, and the second insulating area extends outward from the large wafer. Third, the wafer worked on by the apparatus

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does not limit the apparatus. It has been held that "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "Inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

In regard to the argument:

Further, Barnes is specifically configured in the manner shown above so that a DC voltage can be applied between the first and second electrodes (34, 38) to produce an electrostatic force, which clamps the wafer (32) in situ between the electrodes (34, 38). [Col. 3, 1. 64-Col. 4, 1. 1]

The Examiner disagrees. The argument is moot because the placement of the wafer still teaches the claim limitation as discussed above.

In regard to the argument:

In the 'Response to Arguments' section of the final Office action, the examiner states, "Barnes teaches insulating objects supported by the surface of the face of the single electrode member." However, as discussed herein and in the specification of Barnes, the insulating portions (40 and 44) of the chuck are provided so that the electrodes and the housing can be of different electrode potentials. The insulation portions are not provided for insulating objects that are supported by the chuck, as contended by the examiner.

The Examiner disagrees. The insulation portion 40 supports electrode 38, and electrode 38 supports the edge of the wafer. The insulation insulates and separates the electrode 38 from electrode 34. Therefore, the edge of the substrate that is supported by electrode 38 is insulated from electrode 34.

In regard to the arguments directed to Zhao, the Examiner does not understand the arguments. The arguments are directed to Zhao and Barnes, and there is no combination of Zhao and Barnes as argued or in the rejection at all. Zhao teaches

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a shield that is used to protect the exposed surfaces of an electrode from plasma. One of ordinary skill in the art reading Zhao would recognize the advantage of covering the exposed portion of the substrate support to prevent damage caused by exposure to plasma as taught by Zhao and would be motivated to add the shield to the apparatus of Watanabe, Mulligan, Barnes, and Ito. Therefore, Watanabe, Mulligan, Barnes, Ito and Zhao teach the claimed invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Jeffrie R. Lund/

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